Space Weather Forecast

Issued on Monday, 19 September 2022 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Geomagnetic Storm possible into new UTC working week. Chances of Minor Radio Blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low over the past 24 hours, with only common-class flares. There are currently two numbered sunspots on the visible disc. The most notable is a large region near southern centre disc, although appears to be stable. The other numbered sunspot is small and simple, although produced a long duration common-class flare, which subsequently produced a Coronal Mass Ejection (CME), which is yet to be analysed. Two new and unnumbered sunspots have also emerged in the southwest quadrant, although these appear to be small and simple. No Earth-directed CMEs (Coronal Mass Ejections) were observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind increased from initially background levels of near 350km/s to be elevated, between 500-550km/s due to the arrival of the fast wind from a coronal hole. The total magnetic field strength has been Moderate throughout. Brief periods where the north-south component was southward pointed were observed, however the magnetic field was more generally northward. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was slightly above background throughout, but below the level for radiation storms to occur (S1 or greater).

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Low, but with a chance of rising again to Moderate with any notable flares from the main sunspot on the disc. A further region may also rotate onto the Sun's southeast limb by day 2 (20th), perhaps increasing this risk further.

Solar Wind / Geomagnetic Activity: A CME, which is the combination of two which left the southwest quadrant of the Sun late 15th and early 16th, may glance Earth early on the 19th. However, confidence is low for the timing of any arrival. Current coronal hole sourced fast winds are expected to peak on day 1 (19th), before easing again towards background. No further enhancements expected. However, a large coronal hole approaching centre disc will connect with Earth by the end of the forecast period. Geomagnetic activity will be Quiet to Unsettled at first, with isolated Active intervals possible. There is a slight chance of G1 Minor Storms early day 1 (19th) depending on any CME arrival. Activity then easing to be mostly Quiet day 2 onward, before probably increasing again by end of period due to fast wind from a centre disc coronal hole.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to continue at slightly above background, although with a declining trend.

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Any large flares that do occur from the main sunspot on the disc will give a very slight chance of this increasing further, but likely staying below the S1 level with no radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	3	3	3	3
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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